What is Claimed Is:

1. Apparatus for protecting an electric power distribution system comprising a first line conductor, a second line conductor, and a common neutral conductor, the apparatus comprising:

a first circuit breaker pole comprising:

first separable contacts connected in the first line conductor;

a first arc fault detector generating a first fault signal in response to arc fault currents in the first line conductor; and

a first trip unit comprising a first trip coil and a first unidirectional switch connected in series at a first node, with the first trip coil connected to the neutral conductor and the first unidirectional switch connected to the first line conductor, the first unidirectional switch being turned on by the first fault signal to energize the first trip coil and open the first separable contacts;

a second circuit breaker pole comprising:

second separable contacts connected in the second line conductor;

a second arc fault detector generating a second fault signal in response to arc fault currents in the second line conductor; and

a second trip unit comprising a second trip coil and a second unidirectional switch connected in series at a second node, with the second trip coil connected to the neutral conductor and the second unidirectional switch connected to the second line conductor, the second unidirectional switch being turned on the second fault signal to energize the second trip coil and open the second separable contacts; and

a jumper connected at a first end to the first node and a second end to the second node to directly connect the first and second nodes without electrical isolation and so that the turn on of either one or both of the first unidirectional switch and the second unidirectional switch energizes both the first trip coil and the second trip coil to open both the first and second separable contacts.

2. The apparatus of Claim 1 wherein the first circuit breaker pole further comprises a first ground fault detector generating the first fault signal to turn

on the first unidirectional switch in response to a ground fault in the electric power distribution system, and the second circuit breaker pole comprises a second ground fault detector generating the second fault signal to turn on the second unidirectional switch in response to a ground fault in the electric power distribution system.

3. The apparatus of Claim 2 wherein the first ground fault detector comprises a first sensing coil through which the first line conductor, the second line conductor and the common neutral conductor are all routed, and the second ground fault detector comprises a second sensing coil through which the first line conductor, the second line conductor and the common neutral conductor are all routed.

4. The apparatus of Claim 3 wherein the first sensing coil and the second sensing coil are both supported on a common support.

5. The apparatus of Claim 4 wherein the first and second sensing coils have air cores.

6. The apparatus of Claim 3 wherein the first arc fault detector comprises a pair of first sensing wires connected at spaced points on the first line conductor with one sensing wire of the pair of first sensing wires extending through the first sensing coil, and wherein the second arc fault detector comprises a pair of second sensing wires connected at spaced points on the second line conductor with one sensing wire of the pair of second sensing wires extending through the second sensing coil.

7. The apparatus of Claim 6 wherein the first and second unidirectional switches are silicon controlled rectifiers.

8. The apparatus of Claim 1 wherein the first and second unidirectional switches are silicon controlled rectifiers.

9. A fault detector for an electric power distribution system comprising a first line conductor, a second line conductor and a common neutral conductor, the fault detector comprising:

a first detector comprising:

a first arc current sensor sensing arc currents in the first line conductor;

a first ground current sensor comprising a first sensing coil through which the first conductor, the second conductor and the common neutral conductor are routed;

a first detector circuit responsive to arc currents from the first arc current sensor and to ground currents from the first ground current sensor to generate a first fault signal; and

a first trip circuit comprising a first trip coil and a first unidirectional switch connected in series at a first node, with the first trip coil connected to the common neutral conductor and the first unidirectional switch connected to the first line conductor, the first unidirectional switch being turned on by the first fault signal to energize the first trip coil;

a second detector comprising:

a second arc current sensor sensing arc currents in the second line conductor;

a second ground current sensor comprising a second sensing coil through which the first line conductor, the second line conductor and the common neutral conductor are routed;

a second detector circuit responsive to arc currents from the second arc current sensor and to ground currents from the second ground current sensor to generate a second fault signal; and

a second trip circuit comprising a second trip coil and a second unidirectional switch connected in series at a second node, with the second trip coil connected to the common neutral and the second unidirectional switch connected to the second line conductor, the second unidirectional switch being turned on by the second fault signal to energize the second trip coil; and

a jumper connected at a first end to the first node and at a second end to the second node to directly connect the first and second nodes without electrical isolation, and so that turn on of either or both unidirectional switches energizes both the first and the second trip coils.

10. The detector of Claim 9 wherein the first arc current sensor comprises a first pair of sensing wires connected at spaced apart points on the first line conductor with one sensing wire of the first pair of sensing wires extending

through the first sensed coil, and the second arc current sensor comprises a second pair of sensing wires connected at spaced apart points on the second line conductor with one of the second pair of sensing wires extending through the second sensing coil.

11. The detector of Claim 10 wherein the first sensing coil and the second sensing coil are both supported a common support.

12. The detector of Claim 11 wherein the first and second sensing coils have air cores.

13. The detector of Claim 9 wherein the first and second unidirectional switches are silicon controlled rectifiers.